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ABSTRACT

One of the situations in which the child spends much time is informal, outdoor play settings. Much of this time is spent in spontaneous play in neighborhoods, around the dwelling unit, and on designated playgrounds. Unstructured and spontaneous play is an important part of a child's development. It is through unstructured, child-initiated play that the child is most often free to explore, to test, and to learn from feedback from the environment. This paper: (1) reviews the current major theory of play and play environments; (2) reviews the current research on play environments; and (3) looks at some ideas for the planning and design of play environments based on that research. The basic questions asked are: (1) What is known from the scientific literature about the relations among the physical environment, children's play behavior, and subsequent development? and (2) How are the findings explained, and how are they used in applications to environmental policy, planning, and design? In investigating these questions, attention is paid to both designated playgrounds and neighborhood play spaces and comparisons made between the two. Eleven new implications for environmental policy and for the planning and design of play environments, based on the research, are offered. A 7-page bibliography, 6 tables, and 11 figures are included. (JMK)

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STATE OF THE ART IN PLAY ENVIRONMENT RESEARCH AND APPLICATIONS*

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INTRODUCTION

The purposes of this paper are three-fold. First, to review the current major theory of play and play environments. Second, and most importantly, to review the current state of the art on research on play environments. Third, to look at some ideas for the planning and design of play environments based on that research. The basic questions we are asking are: What do we know from the scientific literature about the relations between the physical environment, children's play behavior, and subsequent development? How do we explain the findings, and how do we use them in applications to environmental policy, planning, and design? In investigating these questions, we will look at both designated playgrounds and neighborhood play spaces, along with making comparisons between the two.

Definitions

First a pair of definitions. Play as talked about in the child-environment literature is very poorly defined and used very broadly. It tends to mean any and all spontaneous activity that is not adult directed but initiated by the child or children themselves. By environment is meant the physical environment, both the designed and the natural environment at all scales from play structures to the entire urban fabric.

OVERVIEW OF CHILD-ENVIRONMENT THEORY AS IT PERTAINS TO PLAY

One of the situations in which the child spends the most time is informal, outdoor play settings. Children are the greatest users of public outdoor space, often using it at a ratio of 10 to 1 to adults and spending a

much greater proportion of time outdoors (Cooper-Marcus, 1974). Much of this time is spent in spontaneous play in neighborhoods, around the dwelling unit, and on designated playgrounds. How can we conceptualize the importance of this time for the child?

Toward an Interactional-Ecological Theory of Child-Environment Relations

It is a truism to say that unstructured and spontaneous play is an important part of development (Garvey, 1977; Piaget, 1951; Singer, 1973; Herron & Sutton-Smith, 1971). It is through unstructured, child-initiated play that the child is often most free to explore, to test, and to learn from feedback from the environment. This is the instrumental view or value of play.

Many theories of child development have extolled the value of the child's interaction with his or her environment (cf. Herron & Sutton-Smith, 1971). I don't need to summarize them here, except to remind us of a few features of one of the most prominent and widely followed theories that bears on the role of the environment.

In Piaget's theory (e.g., Piaget, 1951; cf. review in Hart & Moore, 1973), there are four functional invarients, or biological givens: adaptation, assimilation, accommodation, and equilibration. Piaget holds that the child is consistently adapting to the world and thus to the physical environment in an active, not passive way. This adaptation--which also involves changing the environment--is the well-spring of development, or its motivation. Development is modulated by two opposing but complimentary forces--assimilation and accommodation. Assimilation is the changing and incorporation of information into the child's schemes--or structures--of thinking and behaving, while accommodation is the changing of the structures to partially conform to, or account for, the new information. Information, in

its broadest meaning, comes from the environment, that is, from all that is outside the organism. Thus the child and the environment are in a delicate balance, almost a dance, with the child both altering information and experiences so they will fit with existing ideas (selective attention, selective hearing, selective meaning, etc.), while simultaneously altering his or her cognitive structures to conform to the information. When these reciprocal and complementary functions of assimilation and accommodation are in balance, Piaget refers to this as equilibration. Equilibration occurs, then, when there is a balance between schemes and information from the environment. These periods of equilibration are the major cognitive structures so familiar in Piaget's theory. But true equilibration occurs for only very short periods of time, for the driving force of adaptation will insure that the child seeks out and is confronted with new information or experiences only too ready to challenge and topple--or disequilibriate--the status of existing ideas.

While Piaget's work has been most notable for its focus on cognitive structures and the processes of cognitive development, we must not lose sight of motor and social-emotional development, both of which proceed in much the same manner. Piaget himself has dealt with both, showing the role of sensori-motor development and sensori-motor schemes in the foundation of cognitive development and showing some fascinating interactions between intellectual and social development in his 1942 College de France lectures (Piaget, 1963).

In the case of play and its specific role in development, pragmatists (like equipment manufacturers, most school boards, and many playground designers) stress motor play and motor development, while it may seem that

most theorists stress cognitive development. Recent writers have however tried to give a more equal balance to all three major areas of development (Singer, 1973; Garvey, 1977; Moore, Cohen, Oertel & Van Ryzin, 1979; Rubin, 1980), and it is this holistic view we must adopt when considering research and the design of play environments.

My own work has been attempting to articulate and test a Piagetian-based theory of child-environment relations (Moore, in press). From the above, we have seen several of the major propositions of the theory, including a notion central to our work, namely that of the integral and reciprocal interaction of the child and the environment. But this theoretical notion would lead us not only to expect the child to develop as a function of new information (assimilation and accommodation) but also to change the environment, both through cognitively changing it (thinking about it differently) and physically changing it (constructing one's own play spaces). We see both developmental change and environmental change as integral to development, that is, there may be a more complex feedback system operating than that proposed by Piaget--the mutual change or developoment of both the child and the environment and the interaction between changing the environment and further development.

Lest we fall into an environmental deterministic position (as implicitly many planners and designers do), we should also remember that the "environment" impinging on child development is not only the physical or designed environment but also the social and cultural environment. In other words, we may say that the child and the total socio-physical environment are united in a complex ecology. This would lead us to hypothesize that the interactions between the social and the physical environment, may be more important to the child's experience and to development than either taken in

isolation. This is just one of the theoretical deductions from this interactional-ecological theory of child-environment relations currently being investigated (see Moore, 1983a, 1983b).

RESEARCH ON PLAY AND PLAY ENVIRONMENTS

If the child develops through feedback from interactions with the environment, then it follows that the character of the physical setting available for spontaneous play would be expected to affect the types and degree of interaction in which the child engages.

The question arises, then, what do we currently know about the effects of they physical setting of play on child behavior and development?

Studies have been reported in the research literature on various aspects of child-environment relations from the geographic scale (e.g., the work of Hart, 1977) to the child's home (the work of Parke, 1978). Most studies of play, however, do not differentiate between indoor and outdoor settings. For pragmatic reasons they have tended to be conducted in indoor settings, and preschools in particular, for example, those those reported in Garvey (1977), Millar (1968), and Rubin (1980). The investigation of setting differences in play (between different buildings or between outdoor versus indoor settings) has received only scant attention (Krasnor & Pepler, 1980). Most studies reported in the child development literature focus on the number of materials, the types of toys available, and social aspects of the play environment, without paying attention to possible effects of the molar physical environment, the geographic and architectural environment (e.g., see the latest "New Directions in Child Development" sourcebook--Rubin, 1980).

Despite these caveats, there is some good news. Studies have been conducted on children's spontaneous play as a function of the character of different types of outdoor environments, for example the edited volumes by Altman and Wohlwill (1978), Baird and Lutkus (19??), and Weinstein and David (in press). The literature can be seen to fall into two sets: (1) designated playgrounds; and (2) neighborhood contexts.

While it may seem there are numerous studies of children's behavior in play environments, there is considerably more rhetoric and anecdotal reporting on the subject than there is clear evidence based on careful methodology. I elaborated on this two years ago at the Washington EDRA and Childhood City meetings (Moore, 1981), and don't need to go into it at this time. Is is also fair to say, following Brian Sutton-Smith's dichotomy elsewhere in this volume, that the careful work follows the natural science model and not the interpretative science model.

Two findings that have been replicated many times are that children are the greatest users of public outdoor space (Bjoklid-Chu, 1977; Cooper-Marcus, 1974; R. Moore & Young, 1978), while only as little as 15% of this time is spent at designated playgrounds (Auslander, Juhasz & Carrusco, 1977; Cooper-Marcus, 1974; Hole, 1966).

We will therefore first look at designated playground , and then at the remainder of public outdoor play space.

Research on the Impacts of Designated Playgrounds on Child Development

In the past ten to fifteen years, there has been a renewed interest in the design of children's play environments and on the impacts of design on behavior. Two architects--Friedberg (1969, 1975; Friedberg & Berkeley (1970)

and Dattner (1969)--were early forerunners in the design of children's play facilities, and their designs and writings have led to important new ideas, and to much criticism. Friedberg argued for what he called "linked play," play among all age groups, including adults and the elderly, and argued that complexity and wide potential choice will stimulate linked play behavior. Dattner saw play as a child's way of learning and argued for increasing the number of interactive possibilities between the child and the environment. But neither designer made provision for their designs to be evaluated--what are now called "post-occupancy evaluations" (Moore, 1982)--and their processes of design were intuitive and the product assessed at best by subjective, casual observations, if at all (Derman, 1974).

At the same time, there is in this country a continuing plethora of traditionally styled playgrounds comprised of play equipment selected from one or more of the available manufacturer's catalogues. These traditional playgrounds have been touched by neither designer nor scientist. Much of the current literature on children's play environments seems to be a reaction to and negative criticism of these traditional playgrounds (e.g., Frost & Klein, 1979).

Several studies have looked at children's preferences for and uses of different manufactured play equipment. Hutinger (1955) found increased in upper body strength in third-grade children after playing on horizontal ladder play equipment. Morris (1955) found similar results with children from grades 1 to 3 on a wide variety of gymnastics-like playground equipment. Thompson (1976) found more use of horizontal bars than other types of equipment. Hayward, Rothenberg, and Beasley (1974), Brower and Williamson (1974), and Brown (1980) found, however, that movable equipment is preferred and used more

than static equipment. Brown (1980) found, furthermore, that multi-functional play structures promote more use and moderately more social, language, and motor behaviors then single use equipment. Gabbard (n.d.) has found, however, that after the second-grade year, play activity on all forms of traditional play equipment decreases at increasing rates.

Whereas these above studies have looked at manufactured play equipment, another set of studies have been conducted on conceptual aspects of play environments. Callecod (1974) found that third-grade children overwhelmingly prefer and use playgrounds with high degrees of "challenge," "novelty," and "complexity," characteristics that according to Berlyne (1960) and Ellis (1973) should increase arousal and promote exploratory behavior. Similarily, Krudinier (1978) found more imaginative play in more "encapsulated" outdoor play settings. Some of our own work, as yet unreported, has shown that play environments high also in "loose parts" lead to more cognitive, social-cognitive, and cognitive-motor play than settings lower in "loose parts."

I consider these latter studies much more interesting than the equipment studies for two reasons, and much more pregnant with both future research and design possibilities. They begin to tell us about the quality of the environment related to play and to development, that is, not just what happens vis a vis a particular piece of equipment, but how development is related to design quality of play environments. Admittedly, the independent variables are constructs comprised of many specific variables, but rating scales were developed in all three studies in order to provide reliability for the environmental measurements. Further, the resulting constructs are closer to the language of design and thus can lead more readily to translation and application.

Continuing up the conceptual hierarchy to still broader constructs, a set of studies has looked at traditional versus designed (or, so-called but misnamed "creative") playgrounds. Ellis (1970) and Frost and Klein (1979) have provided seething critiques of traditional playgrounds relative to designed ones. Ellis (1970) intoned, "Playgrounds in general are duplicated from site to site in a monotony of stereotyped apparatus designed to catch the adult's eye," (p. 3) and that traditional playgrounds are "no more than a large combination of large playthings placed together . . . (to) provide opportunities for gross motor activity by simulating, in galvanized steel, some primitive jungle setting" (p. 137). Frost and Klein (1979) added, "Typically the American playground is a collection of single-function equipment--merry-go-round, see-saws, jungle gyms, slides, and swings--designed primarily for exercise" (p. 46). And, in his opening remarks to this conference, Joe Frost used the terms "fixed steel, single function structures . . . with a sports/exercise exclusive mentality."

What does the research literature say about the differences between traditional and designed play environments? While Brown (1980) noted no differences on a range of social, language, and motor behaviors between more versus less contemporary designed playgrounds, Van Valkenberg (1978) Strickland (1979), Hayward et al. (1974), and Gabbor (n.d.) all found greater, longer, and more varied use of contemporary designed playgrounds than traditional playgrounds. Strickland (1979) also found more complex cognitive and social play behaviors on the designed playgrounds.

Another line of research on designated playgrounds--and the last to be reviewed here--has looked at adventure playgrounds built by children

themselves. This notion has been prominent in much of the literature and discussions about children's play and play settings. The argument is that children will engage in more developmentally supportive behaviors on adventure playgrounds (those with loose parts for the children to build their own play environment) than on traditional or even contemporary playgrounds (Cooper, 1970; Nicholson, 1971; Spencer, Tuxford & Dennis, 1964).

Though not made explicit in the literature on adventure playgrounds, the implicit theory behind them is essentially (if informally) Piagetian. It is believed by its proponents that, "Children love to interact with variables, such as materials and shapes; smells and other physical phenomena, such as electricity, magnetism, and gravity; media such as gases and fluids; sounds, music and motion; chemical interactions, cooking, and fire; and other humans and animals, plants, words, concepts, and ideas" (Nicholson, 1971, p. 30).

Adventure playgrounds began in the 1940s when the Danish landscape architct, Sorenson, noticed that children seemed to enjoy playing with the construction materials on playground sites, and seemed to gain more pleasure from this than from playing on the completed playground. The first adventure playground was begun in the Copenhagen suburb of Emdrup and is described in a 1951 Danish article by Sorenson (1951).

He and his followers argued that the greater the variety of experiences available to a child in the formative years and the greater the opportunity for creative and constructive play, the more rapid the development of cognitive skills (cf. Cooper, 1970). Nicholson (1971) summed up the theoretical position when he stated thje oft-quoted hypothesis, "In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of

variables in it" (p. 31). He called this the "theory of loose parts." Other exponents argued that the nature of constructive activities with loose parts would also lead to more cooperative behavior among children (Allen, 1968; Benjamin, 1974; Lambert & Pearson, 1974).

Only four studies have been reported in the literature that look at the issue at all empirically and carefully, and the results are somewhat contradictory. Based on semi-structured observations, Cooper (1970) reported a greater variety of activities, ages, cross-age interaction, and group sizes on London adventure playgrounds than on comparable traditional playgrounds. She also reported two community benefits: reduction in neighborhood vandalism and greater community involvement.

One of the few studies to compare traditional and alternative types of playgrounds was the well-known and influential study by Hayward, Rothenberg, and Beasley (1974). They compared traditional equipment playgrounds, contemporary playgrounds, and adventure playgrounds designed by architects or landscape architects. Using behavior mapping methods together with behavior setting records and interviews with a sample of children, they found that children spend more time and engage in more cognitive play activities on adventure playgrounds than they do on contemporary or traditional playgrounds. While movable equipment was greatly preferred over static equipment on the traditional playgrounds, multiple equipment was preferred over isolated items on the contemporary sites and building and clubhouse activities were preferred at the adventure play settings. They also found more adult participation with children on adventure playgrounds. Similar findings are reported in a less rigorous study by Thompson and Rittenhouse (1974). Van Ryzin (1978) found, however, that the percentage of time spent in

environmental manipulation (a measure of cognitive activity) was high (60-82% of the time on a sample of adventure playgrounds in London), but was independent of the amount of manipulables present. Thus, while there is some support for the increased amount of cognitive play activities on adventure playgrounds relative to other types of designated playgrounds, it is not clear from these reported studies to what we attribute this cognitive activity: self selection, significant others involved in the setting, the character of the physical setting or some combination of these factors.

Controlling somewhat for these factors through quasi-experimental research procedures and the analysis of covariance (Moore, 1983d), one of our own as yet unreported studies has found that the greater incidence of cognitive, cognitive-social, cognitive-motor and cooperative play activities is related to the character of the physical settings, and to the amount of loose parts available in particular.

Research on the Impacts of Neighborhood Play Settings on Child Development

It was mentioned earlier that while children are the greatest users of public outdoor space, less that 15% of their time outdoors is spent on designated playgrounds. While the research literature reviewed above would suggest that more time might be spent, and with greater benefits, if more and especially more appropriate play environments were provided (contemporary designed and adventure in particular), the fact remains that the majority of children's time outdoors is spent on un-designated settings. The claim, or hyposthesis, has been advanced, furthermore, that children engage in a greater range of developmentally supportive behaviors in neighborhood play settings (front yards, corner lots, back alleys, etc.) than on designated playgrounds (Clay, 1971, 1972; Wood, 1976).

Many observational studies have been conducted of children's play in everyday neighborhood settings and around the child's dwelling unit. Researchers have looked at territorial range (Anderson & Tindall, 1972; Coates & Bussard, 1974) and age and gender differences in spatial use (Bjorklid-Chu, 1977; Hart, 1977; Payne & Jones, 1977; Saegert & Hart, 1978) among other issues.

The hypothesis that children prefer and make greater use of the everyday outdoor environment than designated playgrounds is supported by a plethora of studies.

Brower (1977) found that children's play extends throughout the neighborhood, with found spaces such as porches, sidewalks, curb areas, and stoops being the most heavily used. R. Moore (1980) found that natural areas account for over one-quarter of all favorite play places, while designed schoolyards and playgrounds account for less than 10 percent. Hart (1979) found that children prefer natural landscapes, that the spatial richness and meaning children attach to the environment is related to their access to natural areas and elements, and that children's experience and memory for places is related to their ability to modify their environment. Bishop and Foulsham (1973) found that small scale elements in the environment such as kiosks, telephone booths, and vacant lots are favorite places.

In a recent review, R. Moore and Young (1978) identified 34 studies relating to neighborhood play settings. One study (R. Moore, 1978) indicated that of 72 environmental elements mentioned by children as favorite play places, only two (the child's own home and streets) were mentioned by more than 50% of children. A similar study by Maurer and Baxter (1972) showed that children emphasized homes, natural features, and other built structures, in

that order, as being favorite play spaces. An analysis of six residential behavior mapping studies done in the period 1971 to 1977 (based on charts in Moore & Young, 1978) leads me to the conclusion that, in general, children's favorite neighborhood play places are (1) paved areas (like streets, sidewalks, and paths), (2) front yards and porches, public open space (including woods, grassy areas, and open fields), and (3) backyards, with designated playgrounds again at the bottom of the list.

It is therefore clear from these studies that children prefer and use informal neighborhood spaces as much as 6 to 1 over designated playgrounds and that they also prefer and use natural features and everyday urban features in the environment more than specially built areas.

While we can make conclusions about preferences and use from the research literature, less is known about the impacts on children's development. In one study, Hart (1977) found that children's environmental learning is related to the amount of exploration possible of the surrounding environment and of the territorial ranage children are permitted by their parents. His own work, plus earlier work by Anderson and Tindall (1972), have shown that territorial range in gender-related, little girls being given much less freedom to explore their environment and thus to learn about the environment.

Comparison of Designated and Neighborhood Play Environments

Another part of one of our studies looked at the types of developmentally-related play behaviors occurring in neighborhood settings in comparison to adventure playgrounds. This study is, as far as I know, the only one to empirically compare designated playgrounds with informal

neighborhood play spaces in terms of demonstrating actual impacts on behavior, not just children's stated preferences. A quasi-experimental field study was conducted using observational instruments (Moore, 1983 c). Subjects were randomly selected from all children using the outdoor areas of an inner-city neighborhood during the summer of 1977 including those using an adventure playground in the heart of the neighborhood. The children ranged from 3 years 6 months to 14 years of age and were 99% black. Based on random space and time sampling, a total of 391 observational cells were recorded, some involving as many as 30 children, so we observed over 6000 children at play. A highly structured observational instrument--called a behavior map--was used to record all play behaviors in which the children were engaged (26 different behaviors) and where they occurred (31 different types of settings--see Figure 1).

Insert Figure 1 about here

What we are finding is the following: There are significantly more cognitive play behaviors on adventure playgrounds than in neighborhood play settings (40% of all behaviors observed on adventure playgrounds versus only 10% in the neighborhood--see Table 1). Furthermore, from 2 to as much as 10 times more fantasy, constructive, and cooperative play is evident on adventure playgrounds (see Table 2).

Insert Table 1 about here

Insert Table 2 about here

We are also finding a more complex picture when we look at subject variables. The gender and/or age composition of groups involved in play is significantly related to five of the six categories of play we have studied (see Table 3, second and third columns). But in addition, there are significant interactions between the physical environment and both age and gender in affecting social-motor and social-cognitive play (Table 3, fifth through seventh columns). While most play occurs in same-age and same-gender groups (75-84%), these findings indicate that mixed-age and mixed-gender groups engage in more social types of play in informal neighborhood play settings than on adventure playgrounds. Thus the picture as it has emerged to this point is that it is a combination of the physical environment, the social characteristics of children, and the interaction between physical and social variables that affects the type of play in which children engage.

Insert Table 3 about here

Lastly, we have found a type of trade-off or balance between designated adventure playgrounds and neighborhood settings (Moore, Burger & Katz, 1979). While the adventure playground seems to provide for considerably more cognitive play, and traditional playgrounds and playing fields for motor play, neighborhood settings are highest in social play . For instance, while cognitive play is high on adventure playgrounds (40% of observed behaviors being construction or fantasy behaviors), it is in the middle of the list in neighborhood settings (7%-10% of the behaviors). Conversely, social play is high in neighborhood settings (42% of the time being watching, talking, or

walking in groups), but lower on adventure playgrounds (6%-10%--see Table 4). Adults are more in evidence in neighborhood settings, and tend to play a supervisory role, while playing a more involved or observational role on the adventure playgrounds (Table 5). What seems to be emerging is a type of complementary relationship among various settings--no one type of play setting seems to provide for all of children's play activities and developmental needs, and while one provides for one type of play, others including adventure playgrounds and neighborhood play settings provide for other types of play and development.

Insert Table 4 about here

Insert Table 5 about here

This interpretation is concordant with the environmentally based theory of play suggested at the beginning of my paper. The evidence supports four components of the theory: that there are three important components to play--cognitive, motor, and social-emotional; that development through play is an interaction of the child with his or her total environment; that adults and significant others play an important role in interaction with the environment; and, therefore, that development through play is a function of the total socio-physical environment. The findings support the interactional-ecological theory of child-environment relations, and point out some of the linkages between the architecturally designed environment and the social system as they independently and in concert influence development.

IMPLICATIONS FOR A NEW APPROACH TO THE PLANNING AND DESIGN OF PLAY ENVIRONMENTS

The current state of the art of the research literature leads us to some new implications for environmental policy and for the planning and design of play environments. I'd like to briefly summarize a few of them here. This is part of ongoing work which we hope will be summarized in a book in the not too distant future (in the meantime, an interim report is available, see Cohen, Hill, Lane, McGinty & Moore, 1979).

- o First, I think we must develop environmental policy for "play environments," and not just the limited notion of play-"grounds" as static entities located in well-defined locations. The total environment is the setting for play. All environmental settings are the necessary subject matter of both research and design. We must stop our myopic attention on playgrounds, and look at the total environment of play

Insert Figure 2 about here

- o Second, policy makers, recreation leaders, and educators should provide for the full variety of play activities, not just motor or physical play. We need to provide for cognitive, social, and motor play, and for their integration.

- o Third, planners should provide all three types of designated play environments discussed in the research literature--traditional, contemporary and adventure. designed. Different types of play have

been found to occur on each. No one is sufficient for children's needs. All three types complement each other and should be provided in proximity to each other.

Insert Figure 4 (a, b, c) about here

- Fourth, planners and designers should provide not only for the play of children but also for the interaction of children with older siblings, adults, and significant others, in other words, providing for the total ecology of the socio-physical environment of play. This means providing opportunities for adults of all ages to be involved with children, rather than segretating children's areas from adult areas.

Insert Figure 5 about here

- Fifth, planners and designers should also provide a variety of types of play environments at a variety of different, but appropriate locations, e.g., adventure play yards in housing areas, in small and large parks, and adjacent to youth activity centers, contemporary play environments in shopping centers, at amusement parks, and dotted throughout inner-cities, etc.. No one type of location is sufficient.

Insert Table 6 about here

- Sixth, we should provide not only well-known types of play environments but should also develop and study new notions of play environments, like natural play environments where children can play with nature, and both the European style adventure and Swedish and Canadian style of creative play environments where children of all ages can build and develop through doing.

Insert Figure 6 (a,b,c) about here

- Seventh, we should provide not only for these new and innovative types of designated play environments, but also provide more broadly for the whole fabric of children's play in urban, suburban, and rural environments. Here I refer to paying particular and special attention to the "neighborhood of play" including developed play areas, paved play areas for ball play and informal motor play, grassy areas for formal and informal games for all ages, and a variety of play areas for different age groups--and all of these within the normal fabric of the neighborhood.

Insert Figure 7 about here

- Eighth, recreation and urban planners should provide what we have called a "tiered park system"--a planned system of district parks and play areas ranging in scale from intermediate sized district parks through small vest-pocket parks in residential areas, to

special play areas at other children's facilities like schools, youth activity centers, and child care centers, right down to neighborhood based play areas.

Insert Figure 8 about here

- Ninth, we should work to provide what we call "home-based play yards" by rethinking the entire design, or adaptive redesign, of residential areas so that play developmentally appropriate can more readily occur close to home.

Insert Figure 9 (a, b) about here

- Tenth, we still need special integrated play environments, or what are called in much of Scandinavia, "comprehensive play environments," for all ages and for all types of play--infants, toddlers, preschoolers, school-age children, adults--and developed play areas as well as grassy areas, natural areas, and hard surface areas, and including adventure, creative, and natural play yards.

Insert Figure 10 (a,b,c) about here

- Eleventh, to tie it all together, we must repair jour neighborhoods to provide for a "network of play" by linking together all the other elements of the play environment system and thus provide paths to and from the child's home and to and from other parks, schools, and

favorite children's places, and provide for safe play opportunities along the way.

There are many more implications from the current research on play-environment relations that could be discussed. But I hope these eleven will begin to show that the research is both of theoretical interest (very important to the growth of our field for we need to discover and understand more about the environmental components of play) and of practical importance to educators, policy makers, planners and designers. The research to date as I read it, suggests some very important conclusions that run in the face of "standard operating procedure," all across the country (for example the preponderance of traditional, catalogue-selected playgrounds while the literature shows they support only one aspect of child development, and even that not very well after about the second or third grade, or even more pointedly, the continued attention to designated playgrounds even of more innovative type despite the well-replicated finding that children spend up to 85% of their outdoor time in other, neighborhood and home-based play settings).

I would like to conclude this paper with a wonderful quote from Edith Cobb (1977), a very wise person writing about the ecology of imagination in childhood, and who said the following:

> "The study of the child in nature, culture, and society reveals that there is a special period, the little understood prepubescent, halcyon middle age of childhood, approximately from five or six to eleven or twelve, between the strivings of animal infancy and the storms of adolescence--when the natural world is experienced in some happy, evocative way, producing in the child a sense of profound continuity with natural processes."

Reference Notes

1. The behavior mapping instrument used in this study, along with instructions for its use, are available by writing to the Center for Architecture and Urban Planning Research, University of Wisconsin-Milwaukee, MIlwaukee, WI 53201.

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Table 1

Frequencies and Proportions of Types of Play Observed (N=814 cases) in Adventure Playground and Neighborhood Play Settings

	Adventure Playground		Neighborhood Play Settings		X^2 [a]
	Freq	Prop	Freq	Prop	
Social-motor	24	.06	299	.19	14.19**
Motor	33	.08	181	.11	4.99
Cognitive-motor	6	.02	142	.09	6.49
Cognitive	161	.40	165	.10	22.50***
Social-cognitive	38	.10	143	.09	8.54
Social	138	.34	685	.42	9.65*
Totals	400		1615		

[a] All 2x5 tables; df=4.

*p < .05
**p < .01
***p < .001

Table 2

Frequencies and Proportions of Constructive, Fantasy, and Cooperative Play (N=814 cases) in Adventure Playground and Neighborhood Play Settings

	Adventure Playground		Neighborhood Play Settings		X^2 [a]
	Freq	Prop	Freq	Prop	
Constructive Play	151	.21	43	.02	213.23***
Fantasy Play	31	.04	51	.02	17.18**
Cooperative Play	313	.43	585	.21	9.61*
Totals	733[b]	.68	2758[b]	.25	

[a] All df=4.

[b] Totals include all 26 behaviors observed including 6 levels of solitary to cooperative play.

*p $<$ .05
**p $<$ .01
***p $<$ .001

Table 3

Analyses of Variance on Six Types of Play Observed (N=814 cases) in Adventure Playgrounds and Neighborhood Play Settings

	Play Environment (E)	Gender (G)	Age (A)	ExG	ExA	GxA	ExGxA	Residual
Social-motor								
MS	.02	1.46	1.28	.67	1.30	.39	1.37	.35
F	.07	4.13*	3.62*	1.89	3.68*	1.10	3.87**	
Motor								
MS	.06	.93	.78	.08	.11	.07	.15	.13
F	.42	6.96***	5.86***	.62	.79	.55	1.10	
Cognitive-motor								
MS	.39	.26	.36	.00	.04	.02	.03	.12
F	3.32	2.22	3.11	.00	.31	.18	.26	
Cognitive								
MS	1.13	.61	.17	.02	.06	.02	.05	.11
F	10.56***	5.67**	1.63	.22	.54	.15	.48	
Social-cognitive								
MS	.16	.56	.11	.27	.03	.18	.17	.06
F	2.75	9.35***	1.83	4.47*	.49	2.95**	2.83*	
Social								
MS	.04	3.11	1.40	.12	.05	.08	.04	.08
F	.50	38.58***	17.33***	1.47	.65	.95	.45	
df	1	2	3	2	3	6	4	694

*p $\leq$ .05
**p $\leq$ .01
***p $\leq$ .001

Table 4

Order and Mean Percentage of Occurance of Specific Play Behaviors in Adventure Playground and Neighborhood Play Settings[a]

Adventure Playground				Neighborhood Play Settings			
	M	SD	Rank		M	SD	Rank
Construction	.83	1.16	1	Observing	.69	1.36	1
Talking	.60	1.41	2	Talking	.40	1.19	2
Fantasy	.17	1.02	3	Walking	.34	.85	3
Observing	.16	.63	4	Wheel toy play	.31	.70	4
Raucous play	.10	.52	5	Transiting	.24	.71	5
				Gross motor play	.20	.69	6
				Inf. ball games	.13	.78	7

[a]Mean number of behavioral observations during each play type was observed; 1.00 = every observational cell. Of 26 observed behaviors, all behaviors greater than or equal to 10% of the time are shown.

Source: From Moore, Burger & Katz (1979).

Table 5

Proportion of the Time that Different Types of Interactions Occur in Adventure Playground and Neighborhood Play Settings

	Adventure Playground	Neighborhood Play Settings	X^2
Age			
Same-Age Groups	.84	.77	
Mixed-Age Groups	.16	.23	3.43
Gender			
Same-Gender Groups	.75	.75	
Mixed-Gender Groups	.25	.25	.00
Ethnicity			
Same-Ethnic Groups	1.00	.99	
Mixed-Ethnic Groups	.00	.01	.00
Person/People With			
Self Only	.66	.59	
Other Peers	.32	.00	
Teenagers	.01	.06	
Adults	.02	.35	265.82***
Role of Other Person			
Involved	.27	.15	
Supervising	.03	.45	
Surveillance	.70	.40	34.99***

***$p < .001$

Source: From Moore, Burger & Katz (1979).

TABLE 6

RECOMMENDED APPROPRIATE LOCATIONS FOR DIFFERENT TYPES OF OUTDOOR PLAY ENVIRONMENTS

TYPES OF OUTDOOR PLAY ENVIRONMENTS	APPROPRIATE LOCATIONS							
	Child Oriented Facilities			Family Housing Areas		Parks		
	Child Care Centers	Youth Activity Centers	Elem. & Jr. High Schools	Family Housing Area/each 10 to 50 units	Family Housing Area/each 50 to 100 units	Small Parks 3 to 5 acre	Large Parks 5 to 25 acres	Very Large Parks/25 to 250 acres
Home Based Play Yards				•				
Creative Play Yards	•					•	•	•
Adventure Play Yards		•				•	•	•
Natural Play Yards	•	•	•			•	•	•
Play/Learning Environments for Handicapped Children	•	•	•				•	•
Comprehensive Play Yards					•	•	•	•

Source: After Cohen, Hill, Lane, McGinty & Moore, 1979.

Figure Captions

Figure 1. Neighborhood Observation Behavior Map

Figure 2. Planning and design of the total outdoor environment of play. (Figures 2 and 6-11 from McGinty, Cohen & Moore, 1981. Illustrations copyright 1982 by Tim McGinty. Used by permission.)

Figure 3. Relationshop between 18 observable play behaviors and three major categories of play (motor, cognitive, and social). (From Moore, Cohen, Oertel & Van Ryzin, 1979).

Figure 4. Examples of (a) traditional, (b) contemporary, and (c) adventure playgrounds from Sydney, Australia. (From Moore, 1983); photographs by the author.)

Figure 5. Providing for the interaction of children with older siblings and adults.

Figure 6. Diagrams for (a) natural, (b) adventure, and (c) creative play yards.

Figure 7. Planning for the neighborhood of play.

Figure 8. Integrating a variety of play areas into a tiered park system.

Figure 9. Providing a range of different home-based play areas in immediate proximity to the home by redesigning everyday neighborhood spaces: (a) overall diagram, and (b) detail of a child-oriented back yard.

Figure 10. Comprehensive play environments for all ages, including (a) location relative to housing areas and the street pattern, (b) internal organization, and (c) sketch axonometric view of what a comprehensive play environment could look like.

Figure 11. Providing for the network of play by linking together all the other parts of the play environment system by a series of safe--and playful--paths, including (a) overall path network, (b) micro-climates for play along the way, and (c) different types of designated mini-play areas along the way.

UNIVERSITY OF WISCONSIN-MILWAUKEE — SCHOOL OF ARCHITECTURE AND URBAN PLANNING — ENVIRONMENT-BEHAVIOR STUDIES RESEARCH GROUP

NEIGHBORHOOD OBSERVATION

EVALUATION OF CHILDREN'S OUTDOOR RECREATION ENVIRONMENTS

OBSERVER: DATE: TIME:

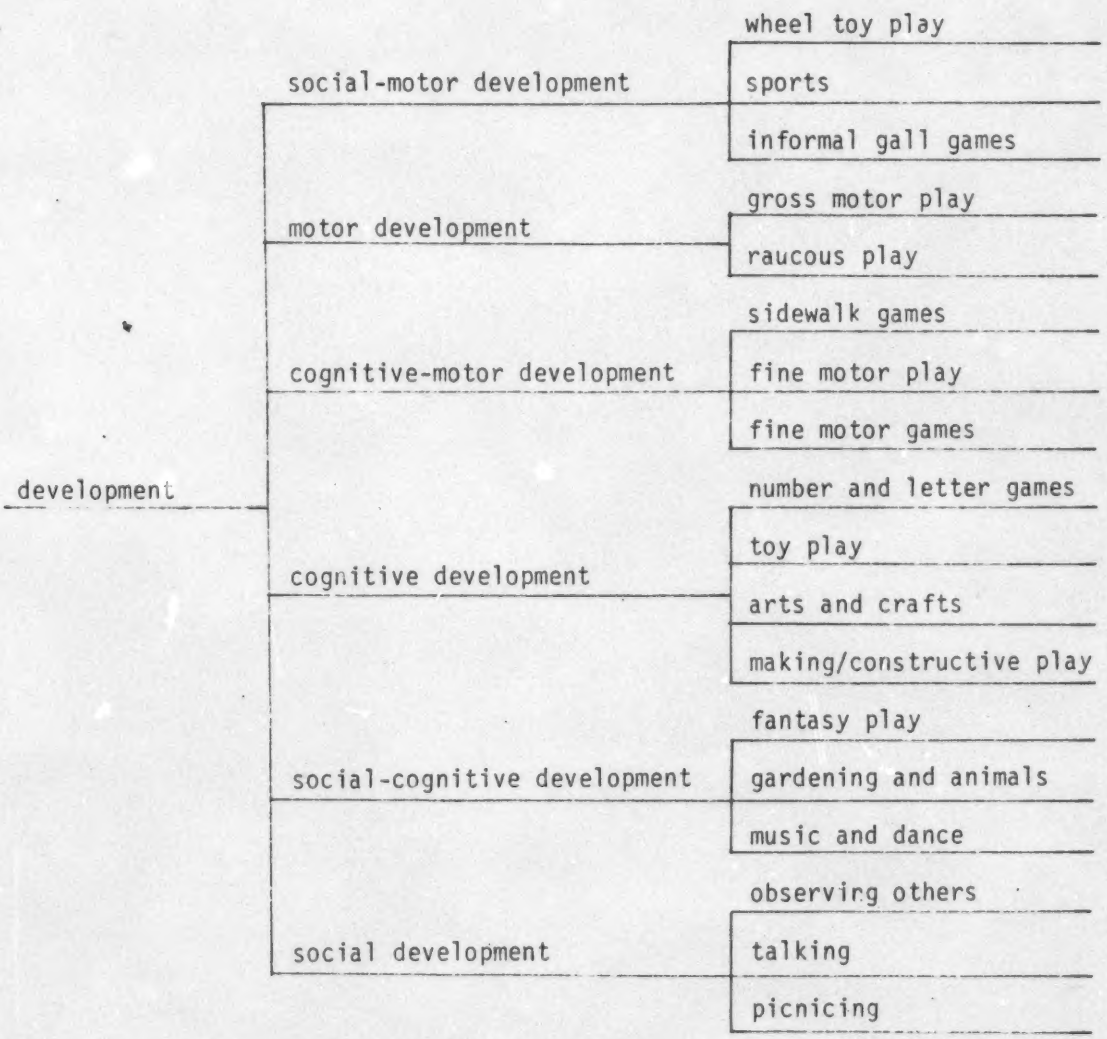
ENVIRONMENT
- LOCATION
- ENVIRONMENTAL SETTING
- OBJECT (overview)
- RANGE of activity

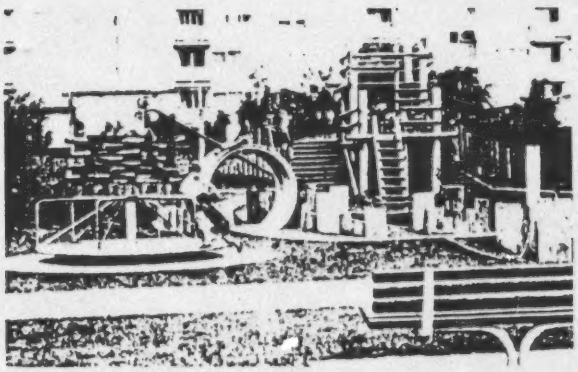
GROUP
- SEX & SIZE of group
- RACE
- AGE
- HOW WITH
- RACE of other people

BEHAVIORAL CATEGORIES
- WHEEL TOY PLAY
- SPORTS
- DAY BALL GAMES
- GO-KARTING PLAY
- BASEBALL PLAY
- SLEDDABLE GAMES
- TAG & LET GAMES
- TUMBLING PLAY
- PRE-HUNTING GAMES
- TOY PLAY
- ARTS & CRAFTS
- PAINTING
- FANTASY
- GARDEN & NATURE
- MUSIC & DANCE
- WALKING
- LISTEN TO RADIO
- OBSERVING
- RELAXING
- USE OF CARS
- HOUSE CHORES
- PLAYGROUND
- VANDALISM
- OTHER (write in)

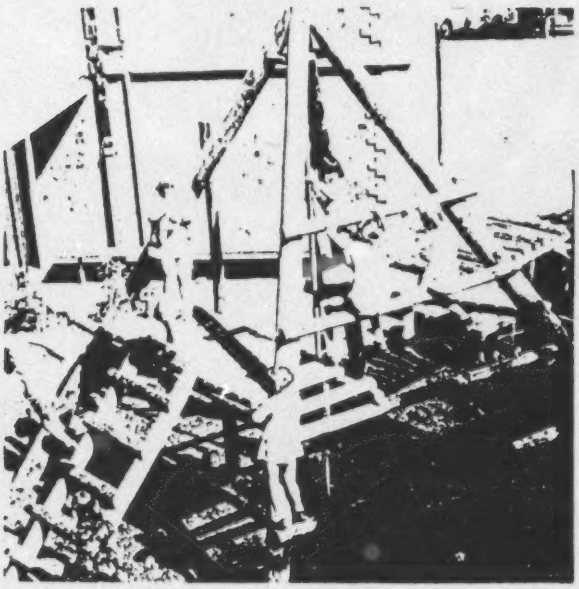
QUAL. SCALE
- INTERACTION: solitary, parallel, coop, compet, show off, fighting
- INVOLVEMENT: passive, half, active

play environments

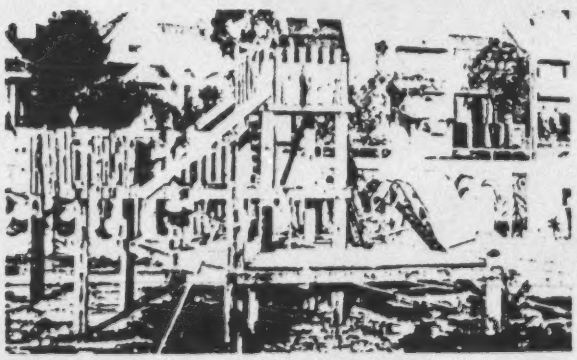

development
social-motor development
wheel toy play
sports
informal gall games
motor development
gross motor play
raucous play
cognitive-motor development
sidewalk games
fine motor play
fine motor games
cognitive development
number and letter games
toy play
arts and crafts
making/constructive play
social-cognitive development
fantasy play
gardening and animals
music and dance
social development
observing others
talking
picnicing



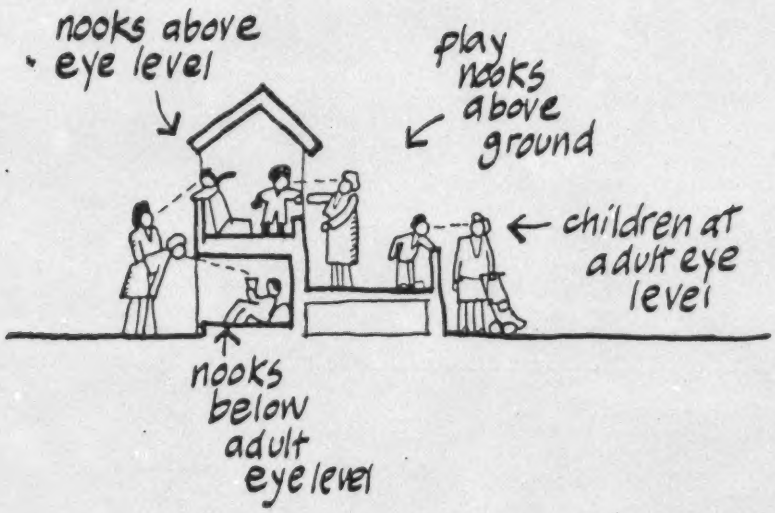
a

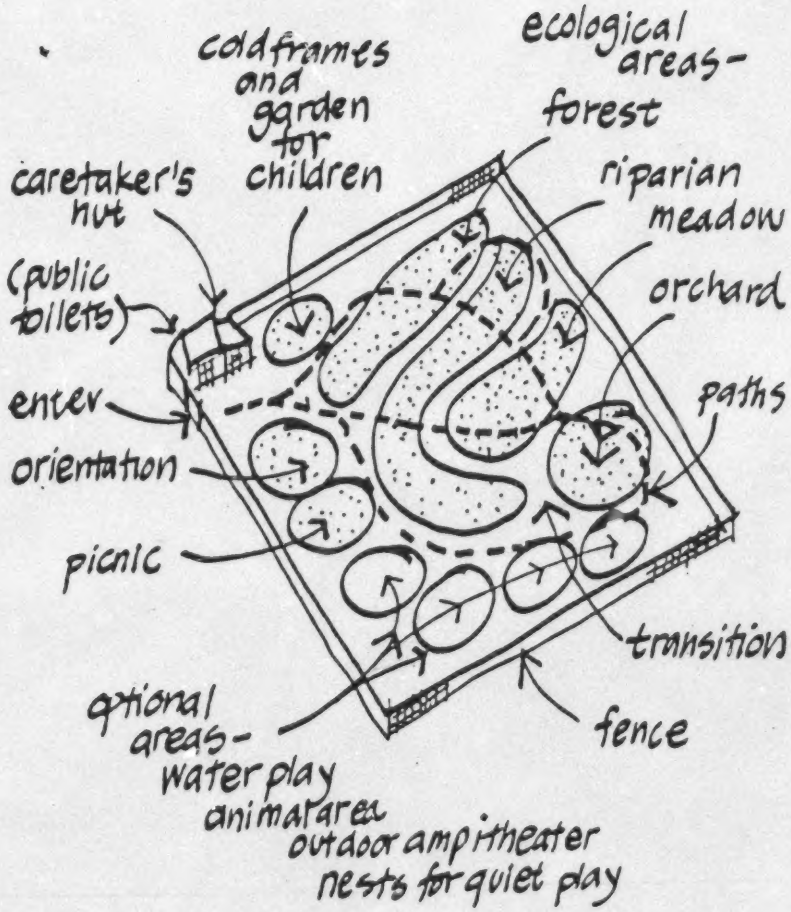


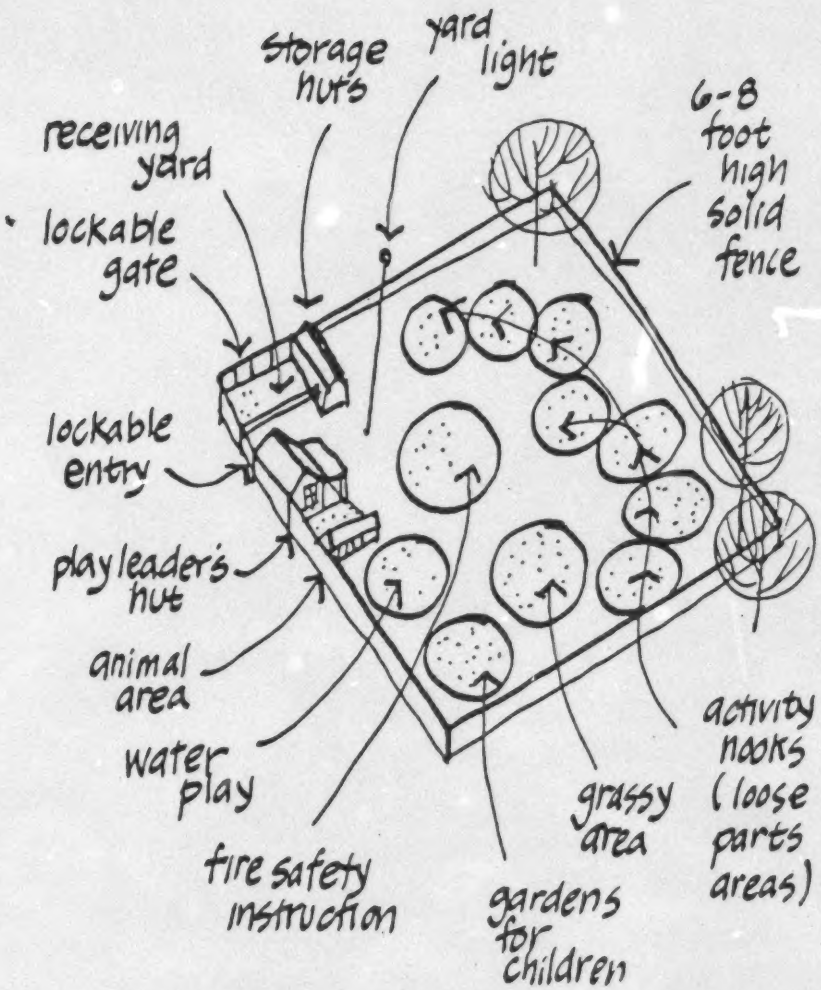
b

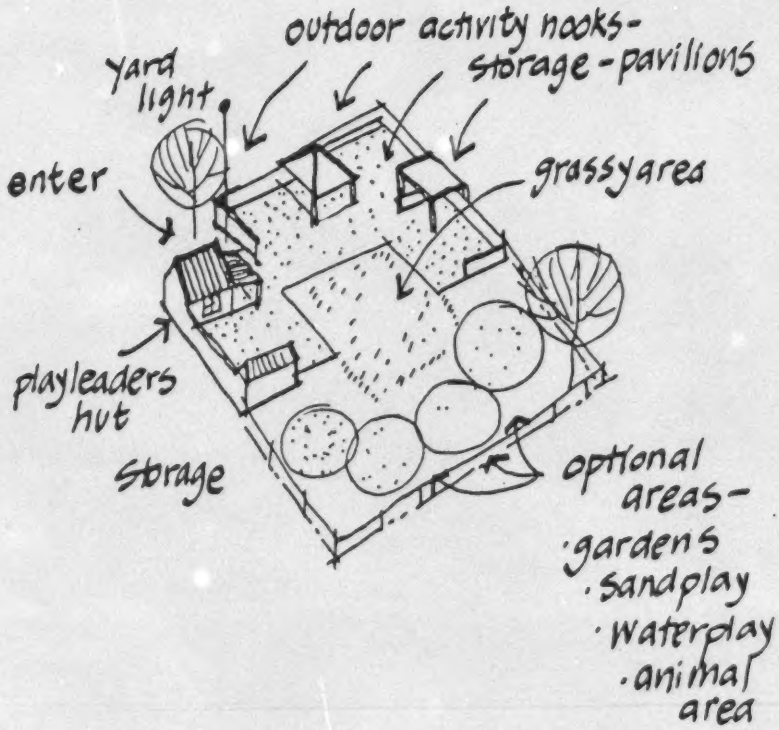


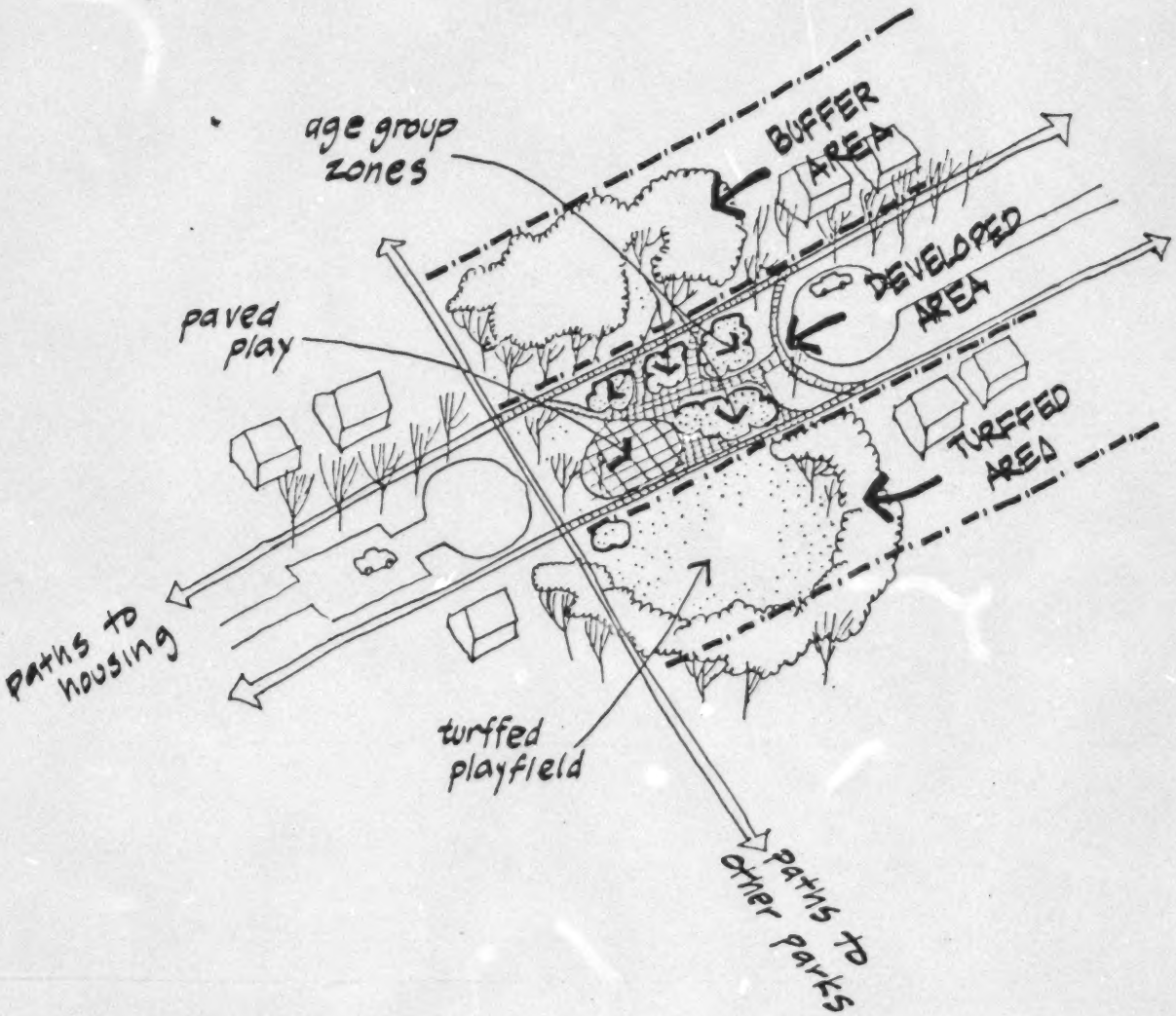
c

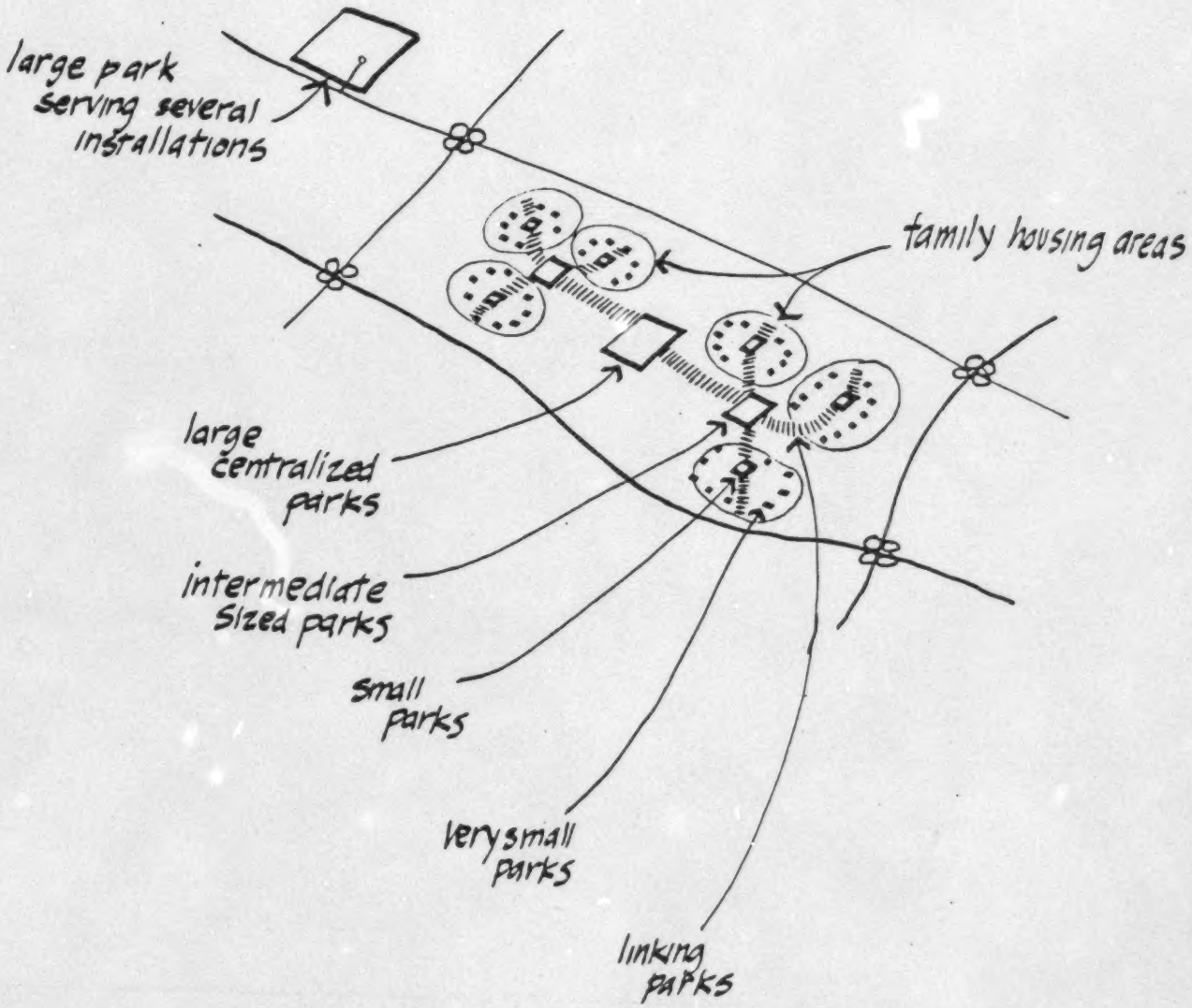

nooks above eye level
play nooks above ground
children at adult eye level
nooks below adult eye level

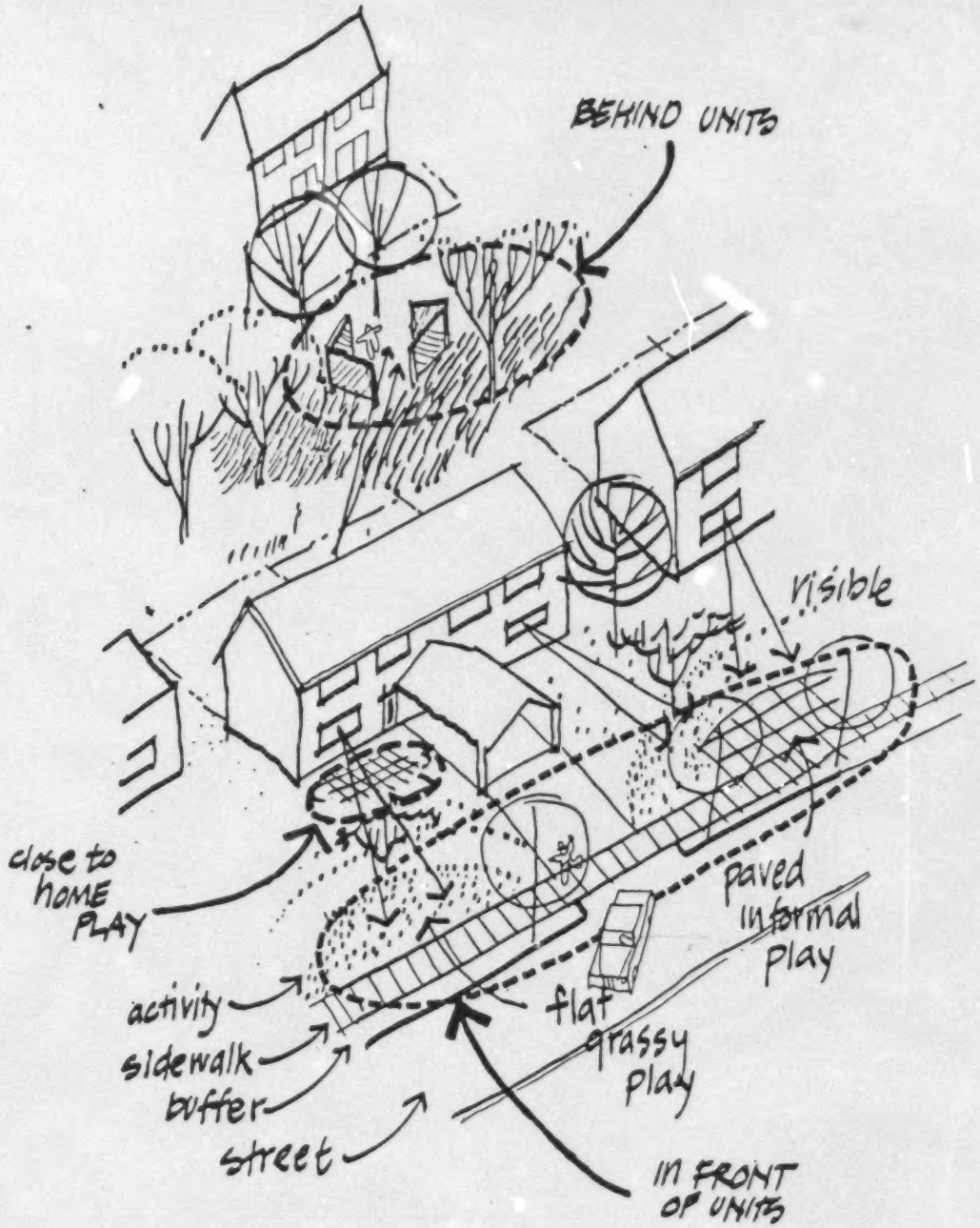

coldframes and garden for children
ecological areas-
forest
caretaker's hut
riparian meadow
(public toilets)
orchard
enter
paths
orientation
picnic
transition
optional areas-
water play
animal area
outdoor amphitheater
nests for quiet play
fence

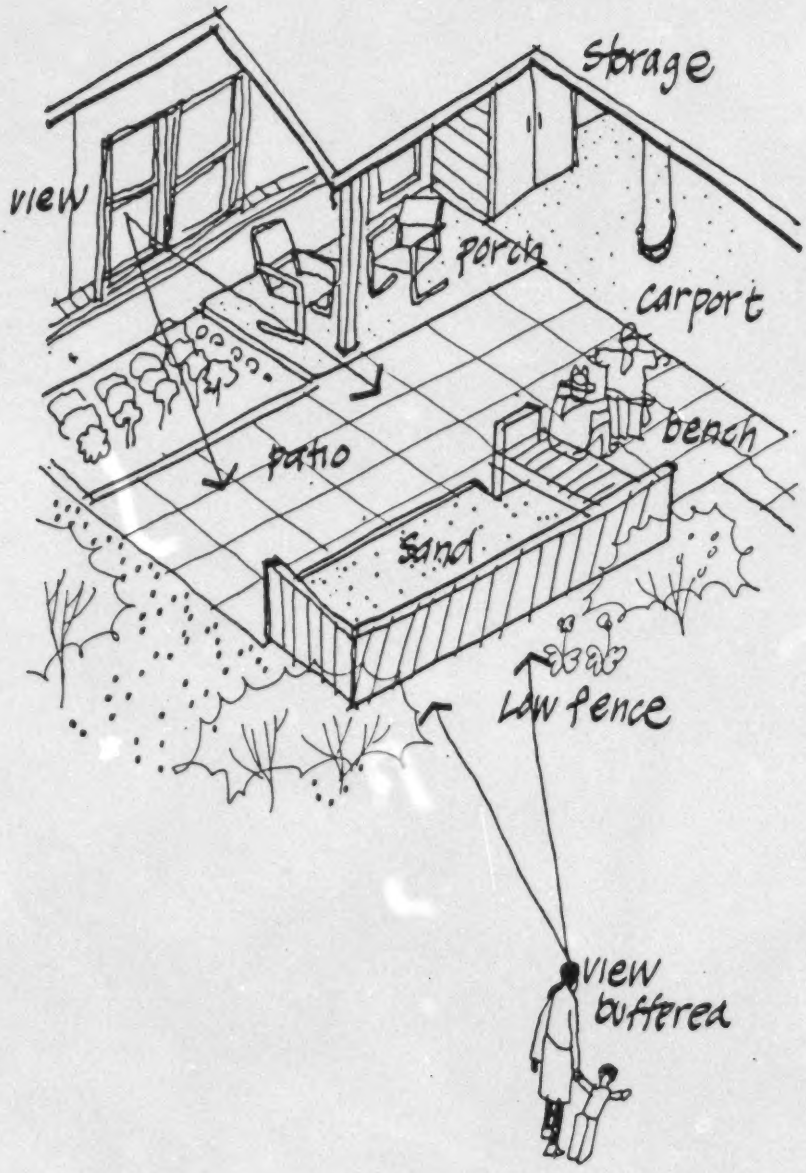

storage huts
yard light
receiving yard
lockable gate
6-8 foot high solid fence
lockable entry
play leader's hut
animal area
water play
fire safety instruction
gardens for children
grassy area
activity nooks (loose parts areas)

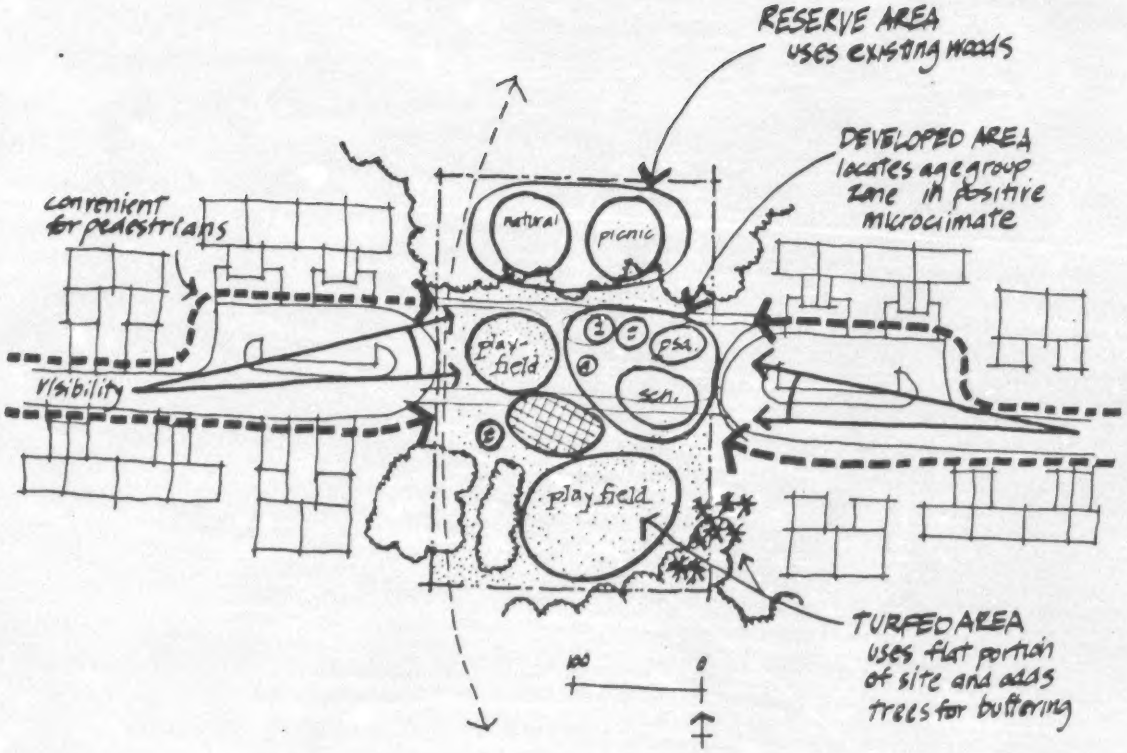

outdoor activity nooks-
storage-pavilions
yard light
enter
grassy area
playleaders hut
storage
optional areas-
·gardens
·sandplay
·waterplay
·animal area

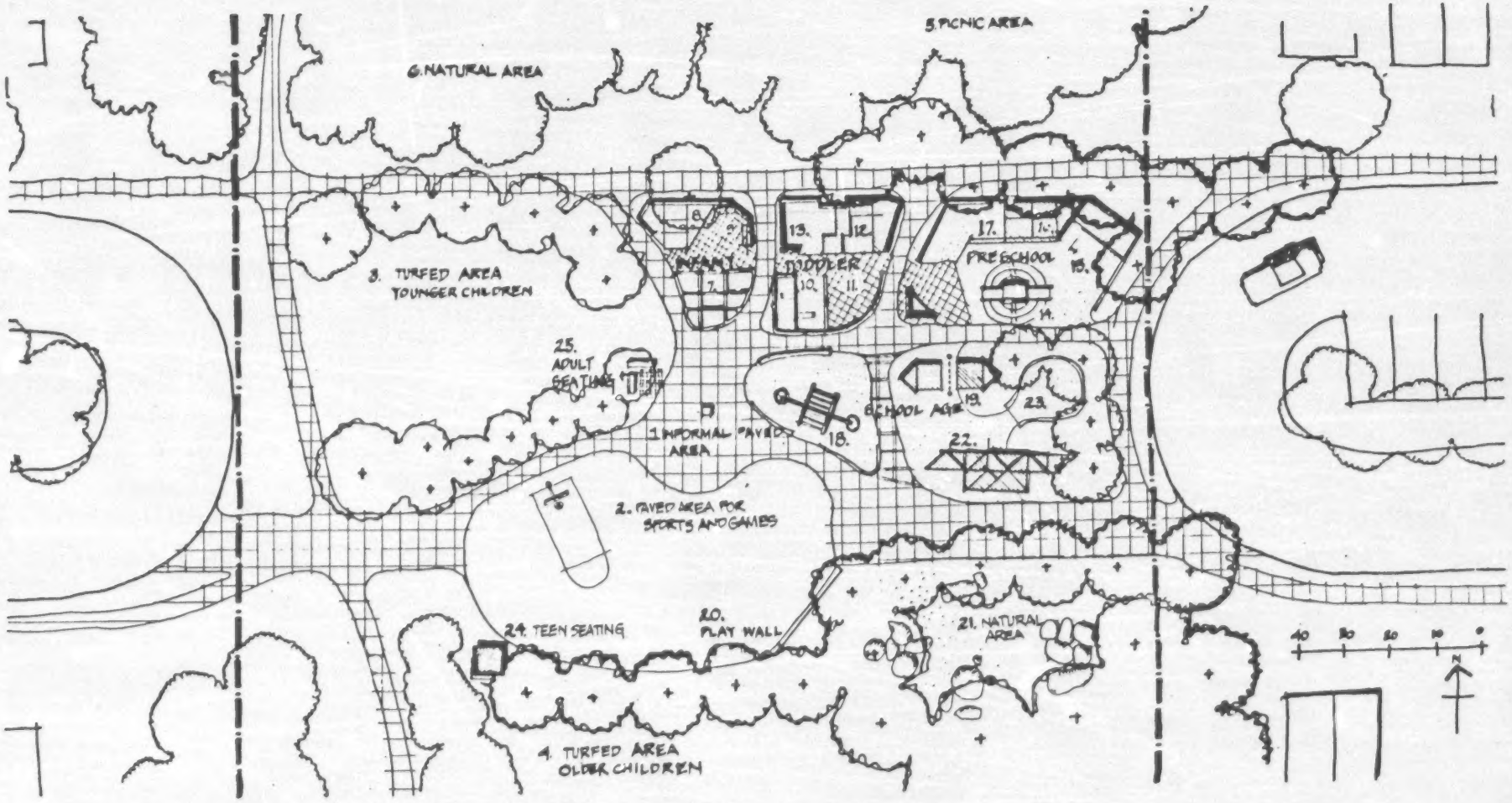

age group zones
BUFFER AREA
DEVELOPED AREA
paved play
TURFFED AREA
paths to housing
turffed playfield
paths to other parks


large park serving several installations
family housing areas
large centralized parks
intermediate sized parks
small parks
very small parks
linking parks


BEHIND UNITS
visible
close to HOME PLAY
paved informal play
activity
sidewalk
buffer
street
flat grassy play
IN FRONT OF UNITS


Storage
view
porch
carport
bench
patio
sand
Low fence
view
buffered


RESERVE AREA
uses existing woods
DEVELOPED AREA
locates age group
zone in positive
microclimate
convenient
for pedestrians
natural
picnic
play-
field
visibility
play field
TURFED AREA
uses flat portion
of site and adds
trees for buffering
100
0


5. PICNIC AREA
6. NATURAL AREA
3. TURFED AREA YOUNGER CHILDREN
8.
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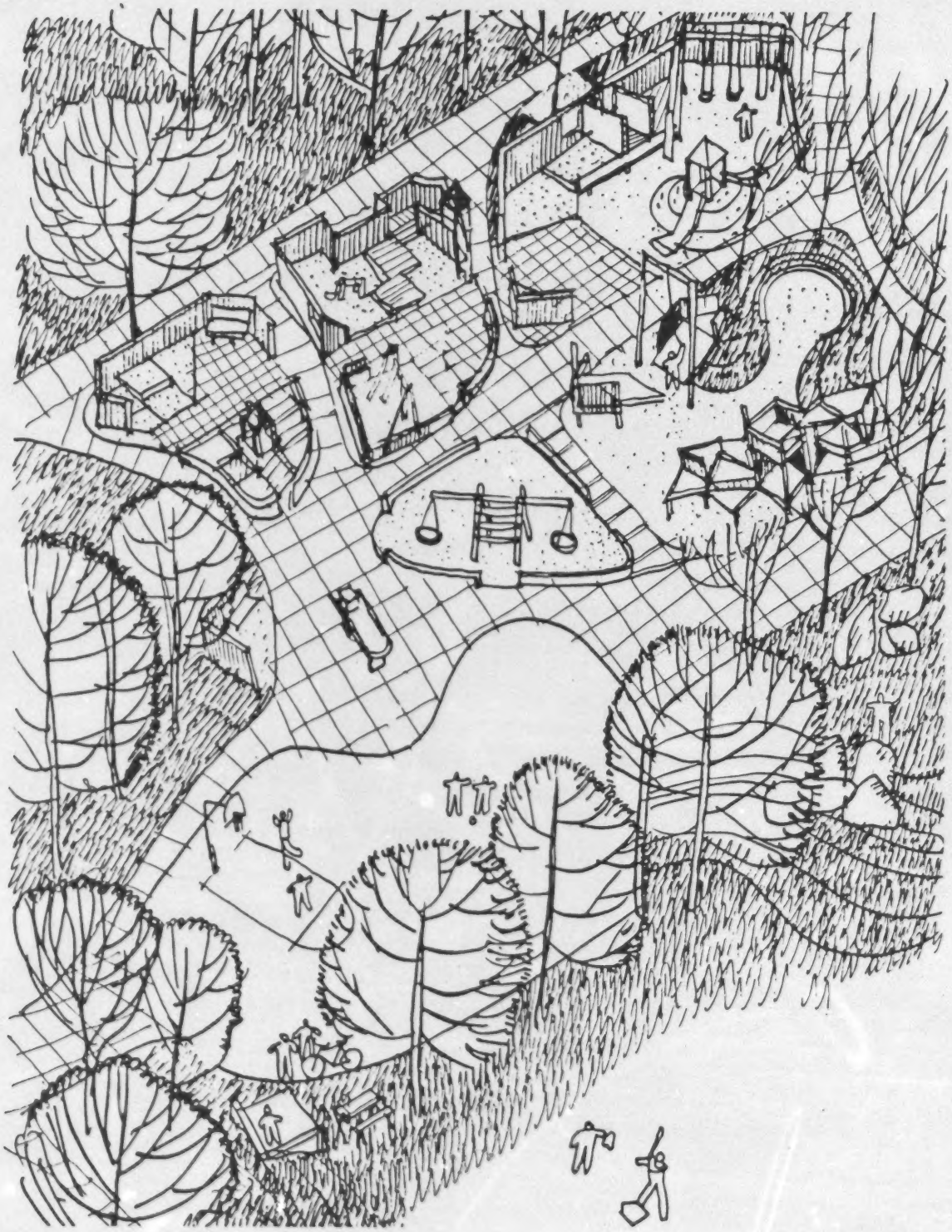
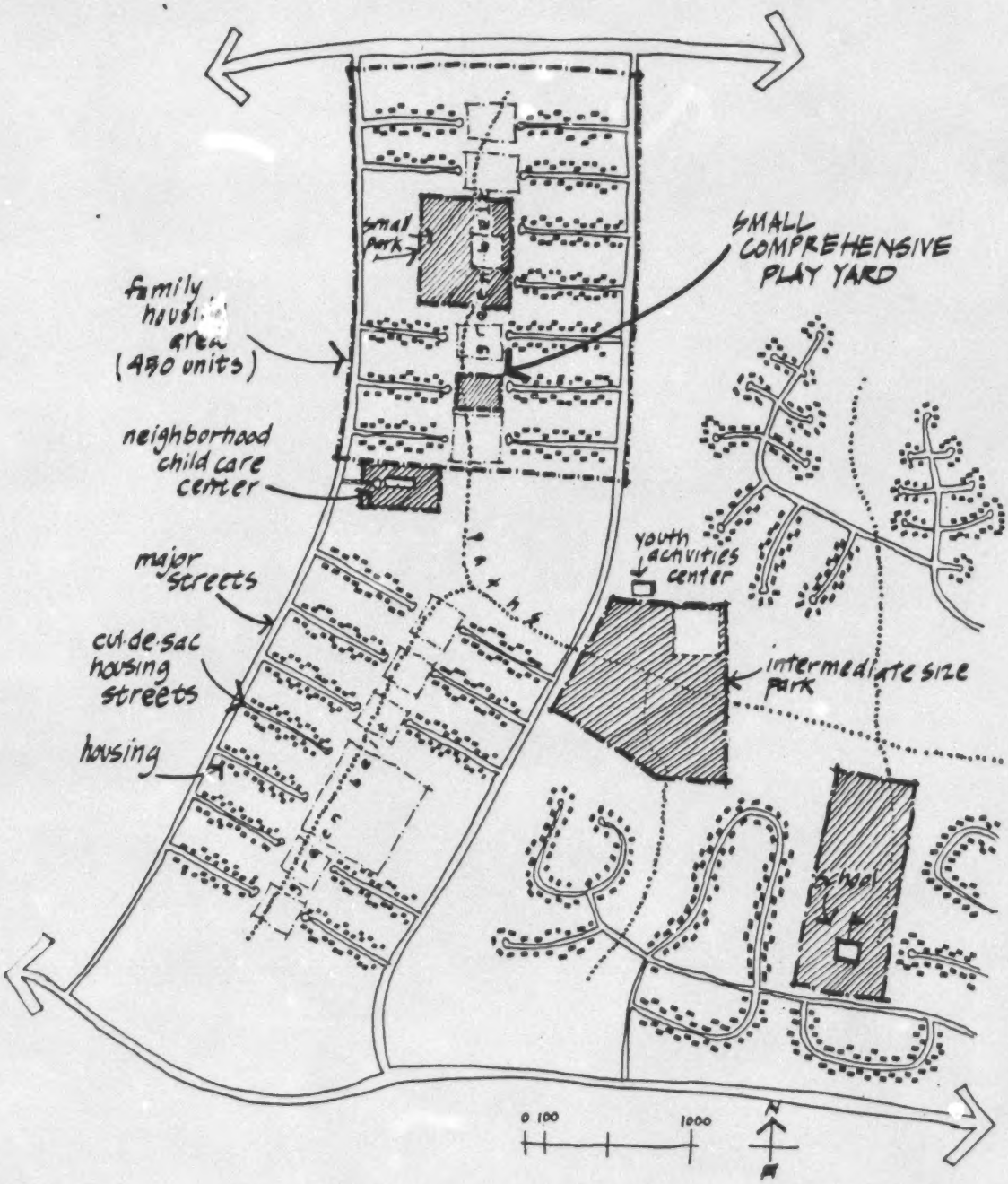
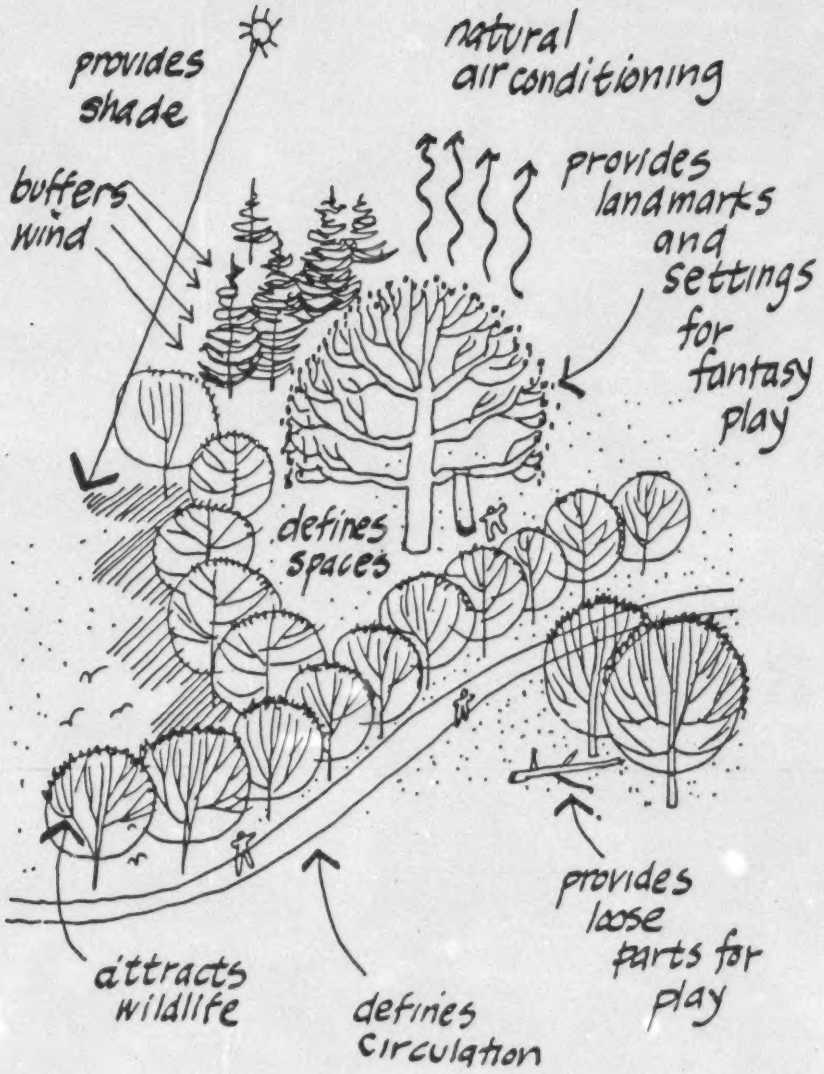
16.
15.
14.
25. ADULT SEATING
1. INFORMAL PAVED AREA
18.
19.
23.
22.
2. PAVED AREA FOR SPORTS AND GAMES
24. TEEN SEATING
20. PLAY WALL
21. NATURAL AREA
4. TURFED AREA OLDER CHILDREN




small park
SMALL COMPREHENSIVE PLAY YARD
family housing area (480 units)
neighborhood child care center
youth activities center
major streets
cul-de-sac housing streets
intermediate size park
housing
school
0 100
1000
N


provides shade
natural air conditioning
buffers wind
provides landmarks and settings for fantasy play
defines spaces
provides loose parts for play
attracts wildlife
defines circulation